

Please amend Claim 3 as follows:

A liquid crystal display apparatus comprising:

a liquid crystal display panel having a predetermined display characteristic;

a luminescent unit located adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, and a light source, wherein  
5 the collected ambient light is used as a backlight of the liquid crystal display panel;

a light receiving device substantially countering the ambient light directed toward the light collector to detect the amount of ambient light collected by the light collector; and

a control circuit electrically connected to the liquid crystal display panel and the light receiving device, wherein the control circuit varies the predetermined display characteristic in  
10 accordance with the amount of the detected ambient light, wherein the predetermined display characteristic includes transmittance, the control circuit changing a minimum transmittance in accordance with the amount of collected ambient light, and wherein the liquid crystal display panel includes an electrode to which a voltage of a predetermined range is applied, wherein the control circuit shifts the predetermined voltage range in accordance with the amount of collected ambient  
15 light to thereby change the minimum transmittance.

Please amend Claim 7 as follows:

A liquid crystal display apparatus comprising:

a liquid crystal display panel having a predetermined display characteristic;

a luminescent unit located adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, and a light source, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

5 a light receiving device substantially countering the ambient light directed toward the light collector to detect the amount of ambient light collected by the light collector; and

a control circuit electrically connected to the liquid crystal display panel and the light receiving device, wherein the control circuit varies the predetermined display characteristic in accordance with the amount of the detected ambient light, wherein the predetermined display characteristic includes transmittance, the control circuit changing a minimum transmittance in  
10 accordance with the amount of collected ambient light, and wherein the liquid crystal display panel includes an electrode to which a voltage of a predetermined range is applied, and wherein the control circuit narrows the predetermined voltage range in order to decrease the contrast ratio when the amount of collected ambient light is equal to or greater than a predetermined value.

Please amend Claim 8 as follows:

The apparatus according to claim 9, wherein the control circuit is connected to the light source, the control circuit turning off the light source when the amount of collected ambient light is equal to or greater than a predetermined value and turning on the light source when the amount of collected ambient light is less than the predetermined value.

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Please amend Claim 9 as follows:

A liquid crystal display apparatus comprising:

a liquid crystal display panel having a predetermined display characteristic;

a luminescent unit located adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, and a light source, wherein  
5 the collected ambient light is used as a backlight of the liquid crystal display panel;

a light receiving device substantially countering the ambient light directed toward the light collector to detect the amount of ambient light collected by the light collector; and

a control circuit electrically connected to the liquid crystal display panel and the light receiving device, wherein the control circuit varies the predetermined display characteristic in  
10 accordance with the amount of the detected ambient light, wherein the predetermined display characteristic includes transmittance, the control circuit changing a minimum transmittance in accordance with the amount of collected ambient light, and, wherein the luminescent unit includes a cover that moves between an open and closed position to selectively cover the light collector, and wherein the apparatus includes a cover driving apparatus connected to the control circuit to move  
15 the cover between the open and closed positions and the predetermined display characteristic includes opening and closing of the cover.

Please amend Claim 16 as follows:

A liquid crystal display apparatus comprising:

a liquid crystal display panel having a predetermined display characteristic;

a luminescent unit located adjacent to the liquid crystal display panel for providing light to the display panel to illuminate the display panel, wherein the luminescent unit includes a light collector, which collects ambient light, and a light source, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

5                   a light receiving device substantially countering the ambient light directed toward the light collector to generate a light amount signal corresponding to the amount of ambient light collected by the light collector; and

                  a control circuit electrically connected to the liquid crystal display panel and the light receiving device, wherein the control circuit varies the predetermined display characteristic in  
10 accordance with the light amount signal, and, wherein the liquid crystal display panel includes:

                  first and second substrates;

                  a liquid crystal layer arranged between the first and second substrates; and

                  a sealed portion for sealing the liquid crystal layer and defining a peripheral area and  
a display area of the liquid crystal display panel, wherein the light receiving device is formed on one  
15 of the facing surfaces of the first and second substrates in the peripheral area and is arranged adjacent to the display area.

Please amend Claim 17 as follows:

A liquid crystal display apparatus comprising:

                  a liquid crystal display panel having a predetermined display characteristic;

a luminescent unit located adjacent to the liquid crystal display panel for providing light to the display panel to illuminate the display panel, wherein the luminescent unit includes a light collector, which collects ambient light, and a light source, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

5                   a light receiving device substantially countering the ambient light directed toward the light collector to generate a light amount signal corresponding to the amount of ambient light collected by the light collector; and

10                   a control circuit electrically connected to the liquid crystal display panel and the light receiving device, wherein the control circuit varies the predetermined display characteristic in accordance with the light amount signal, and, wherein the liquid crystal display panel includes a pair of substrates, and wherein the light receiving device is arranged facing the luminescent unit on one of the substrates and adjacent to a display area of the liquid crystal display panel.

Please amend Claim 18 as follows:

The apparatus according to claim 16, wherein the predetermined display characteristic includes transmittance, the control circuit changing the minimum transmittance, in accordance with the light amount signal.

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Please amend Claim 19 as follows:

The apparatus according to claim 16, wherein the predetermined display characteristic includes contrast ratio, the control circuit changing the contrast ratio in accordance with the light amount signal.

Please amend Claim 22 as follows:

A liquid crystal display apparatus comprising:

a liquid crystal display panel for displaying an image having a predetermined contrast ratio and brightness;

a luminescent unit arranged adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, a light source, and a cover, which opens and closes to selectively cover the light collector, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a cover driving apparatus for opening and closing the cover;

a light receiving device substantially countering the ambient light directed toward the light collector to generate a light receiving signal corresponding to the amount of ambient light collected by the light collector; and

a control circuit connected to the liquid crystal display panel, the light receiving device, the light source, and the cover driving apparatus, wherein the control circuit controls an ON/OFF of the light source, the opening and closing of the cover, and adjusts the contrast ratio and the brightness in accordance with the light receiving signal, wherein the control circuit includes:

a judgment circuit for generating at least one of a contrast ratio adjustment signal, a brightness adjustment signal, a cover driving signal and an ON/OFF signal in accordance with the light receiving signal;

5 a contrast ratio adjustment circuit connected to the judgment circuit, the contrast ratio adjustment circuit processing an image signal to adjust the contrast ratio in accordance with the contrast ratio adjustment signal; and

a brightness adjustment circuit connected to the contrast ratio adjustment circuit and the liquid crystal display panel, the brightness adjustment circuit processing the image signal, which contrast ratio has been adjusted, to adjust the brightness in accordance with the brightness adjustment signal, and wherein the judgment circuit includes:

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a first judgment circuit for receiving the light receiving signal from the light receiving device and comparing the light receiving signal with a first criterion value to generate a contrast ratio adjustment signal;

a second judgment circuit for receiving the light receiving signal from the light receiving device and comparing the light receiving signal with a second criterion value to generate a brightness adjustment signal;

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a third judgment circuit connected to the cover driving apparatus, the third judgment circuit receiving the light receiving signal from the light receiving device and comparing the light receiving with a third criterion value to generate a cover driving signal; and

a fourth judgment circuit connected to the light source, the fourth judgment circuit receiving the light receiving signal from the light receiving device and comparing the light receiving signal with a fourth criterion value to generate an ON/OFF signal.

Please amend Claim 23 as follows:

A liquid crystal display apparatus comprising:

a liquid crystal display panel for displaying an image having a predetermined contrast ratio and brightness;

5 a luminescent unit arranged adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, a light source, and a cover, which opens and closes to selectively cover the light collector, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a cover driving apparatus for opening and closing the cover;

10 a light receiving device substantially countering the ambient light directed toward the light collector to generate a light receiving signal corresponding to the amount of ambient light collected by the light collector; and

15 a control circuit connected to the liquid crystal display panel, the light receiving device, the light source, and the cover driving apparatus, wherein the control circuit controls an ON/OFF of the light source, the opening and closing of the cover, and adjusts the contrast ratio and the brightness in accordance with the light receiving signal, wherein the control circuit includes:



a linear contrast ratio adjustment circuit for receiving the light receiving signal and processing an image signal to adjust the contrast ratio in a linear manner in accordance with the light receiving signal;

5 a linear brightness adjustment circuit connected to the linear contrast ratio adjustment circuit and the liquid crystal display panel, the linear brightness adjustment circuit receiving the light receiving signal from the light receiving device and processing the image signal, which contrast ratio has been adjusted, to adjust the brightness in a linear manner in accordance with the light receiving signal;

10 a first judgment circuit connected to the cover driving apparatus, the first judgment circuit receiving the light receiving signal from the light receiving device and comparing the light receiving signal with a first criterion value to generate a cover driving signal; and

a second judgment circuit connected to the light source, the second judgment circuit receiving the light receiving signal from the light receiving device and comparing the light receiving signal with a second criterion value to generate an ON/OFF signal.

Please amend Claim 24 as follows:

A liquid crystal display apparatus comprising:

a liquid crystal display panel for displaying an image having a predetermined contrast ratio and brightness;

5 a luminescent unit arranged adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, a light source, and a cover,

which opens and closes to selectively cover the light collector, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a cover driving apparatus for opening and closing the cover;

5 a light receiving device substantially countering the ambient light directed toward the light collector to generate a light receiving signal corresponding to the amount of ambient light collected by the light collector; and

a control circuit connected to the liquid crystal display panel, the light receiving device, the light source, and the cover driving apparatus, wherein the control circuit controls an ON/OFF of the light source, the opening and closing of the cover, and adjusts the contrast ratio and the brightness in accordance with the light receiving signal, wherein the control circuit includes:

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an analog-to-digital converter connected to the light receiving device to convert the light receiving signal to a digital light receiving signal;

a judgment circuit connected to the analog-to-digital converter, the cover drive apparatus, and the light source, wherein the judgment circuit compares the digital light receiving signal with a first criterion value to generate a contrast ratio adjustment signal, compares the digital light receiving signal with a second criterion value to generate a brightness adjustment signal, compares the digital light receiving signal with a third criterion value to generate a cover driving signal, and compares the digital light receiving signal with a fourth criterion value to generate an ON/OFF signal;

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20 a multiplier connected to the judgment circuit to multiply a digital image signal with the contrast ratio adjustment signal to adjust the contrast ratio thereof;

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an adder-subtractor connected to the multiplier and the judgment circuit to perform summation and subtraction on the digital image signal, which contrast ratio has been adjusted, with the brightness adjustment signal to adjust the brightness;

5 a digital signal processing circuit connected to the adder-subtractor to perform a predetermined digital signal process on the digital image signal, which contrast ratio and brightness have been adjusted; and

a digital-to-analog converter connected between the digital signal processing circuit and the liquid crystal display panel to convert the processed digital image signal to an analog image signal.

Please amend Claim 25 as follows:

A liquid crystal display apparatus comprising:

a liquid crystal display panel for displaying an image having a predetermined contrast ratio and brightness;

5 a luminescent unit arranged adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, a light source, and a cover, which opens and closes to selectively cover the light collector, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a cover driving apparatus for opening and closing the cover;

a light receiving device substantially countering the ambient light directed toward the light collector to generate a light receiving signal corresponding to the amount of ambient light collected by the light collector; and

5 a control circuit connected to the liquid crystal display panel, the light receiving device, the light source, and the cover driving apparatus, wherein the control circuit controls an ON/OFF of the light source, the opening and closing of the cover, and adjusts the contrast ratio and the brightness in accordance with the light receiving signal, wherein the control circuit includes:

an analog-to-digital converter connected to the light receiving device to convert the light receiving signal to digital light receiving signal;

10 a multiplier connected to the analog-to-digital converter to multiply the digital image signal with the digital light receiving signal to adjust the contrast ratio thereof;

an adder-subtractor connected to the multiplier and the analog-to-digital converter to perform summation and subtraction on the digital image signal, which contrast ratio has been adjusted, with the digital light receiving signal to adjust the brightness; and

15 a judgment circuit connected to the analog-to-digital converter, the cover driving apparatus, and the light source, wherein the judgment circuit compares the digital light receiving signal with a first criterion value to generate a cover driving signal and compares the digital light receiving signal with a second criterion value to generate an ON/OFF signal.

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Please amend Claim 26 as follows:

A liquid crystal display apparatus comprising:

a liquid crystal display panel for displaying an image having a predetermined contrast ratio and brightness;

5 a luminescent unit arranged adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, a light source, and a cover, which opens and closes too selectively cover the light collector, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a cover driving apparatus for opening and closing the cover;

10 a first light receiving device substantially countering the ambient light directed toward the light collector to generate a first light receiving signal corresponding to amount of ambient light collected by the light collector;

a second light receiving device for generating a second light receiving signal corresponding to a total amount of light illuminating the liquid crystal panel, which includes the ambient light and the light of the light source; and

15 a control circuit connected to the liquid crystal display panel, the first and second light receiving devices, the light source, and the cover driving apparatus, wherein the control circuit controls an ON/OFF of the light source and the opening and closing of the cover in accordance with the first light receiving signal, and adjusts the contrast ratio and the brightness in accordance with the second light receiving signal.